

## *Leptocorticium* (Corticaceae s.l., Basidiomycota): New species and combinations

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The genus *Leptocorticium* is redescribed, and a key to the species is provided. A new taxon, *Leptocorticium tenellum*, is described, and two new combinations, *L. sasae* and *L. utribasidiatum*, are proposed. *Dentocorticium nephrolepidis* is determined to be conspecific with *L. cyatheae*. All four species are described and illustrated.

**Taxonomical novelties:** *Leptocorticium sasae* (Boidin, Cand. & Gilles) Nakasone, *Leptocorticium tenellum* Nakasone, *Leptocorticium utribasidiatum* (Boidin & Gilles) Nakasone

**Keywords:** Corticaceae, *Dentocorticium*, *Dendrothele*

The genus *Leptocorticium* Hjortstam & Ryvar den (2002) was erected to accommodate *Corticium cyatheae* S. Ito & S. Imai. *Leptocorticium* is characterized by a thin, effuse, pruinose basidiocarp with slender, obclavate leptocystidia, dendrohyphidia, short pedunculate basidia with long sterigmata, and subfusiform to cylindrical basidiospores. Similar stalked basidia with striking long sterigmata are present in *Dentocorticium sasae* Boidin, Cand. & Gilles, *D. nephrolepidis* Boidin & Gilles and *D. utribasidiatum* Boidin & Gilles. Examination of these taxa revealed that they are congeneric with *Leptocorticium* and that *D. nephrolepidis* is conspecific with *C. cyatheae*.

In this study, the generic circumscription of *Leptocorticium* is slightly modified to accommodate three additional taxa. All four species of *Leptocorticium* are described and illustrated, and a key to the species is provided.

### Material and methods

Thin, freehand sections from the specimens were mounted in aqueous potassium hydroxide (2 % weight/volume) and aqueous phloxine (1 % w/v) or Melzer's reagent (KIRK et al. 2001) and examined under an Olympus BH2 compound microscope (Olympus America, Inc., Melville, New York). Drawings were made with a camera lucida attachment. An Olympus zoom stereo microscope, model SZH, with a DP12 digital camera system was used to take photographs of the hymenophore. Color names are from KORNERUP & WANSCHER (1978) or, if capitalized, from RIDGWAY (1912), and literature citations follow B-P-H/S (BRIDSON & SMITH 1991)

for journals and the Taxonomic Literature second edition series (STAFLEU & COWAN 1976) for books. Herbarium designations follow those of HOLMGREN, HOLMGREN & BARNETT (1990).

### Taxonomy

***Leptocorticium*** Hjortstam & Ryvar den, Synopsis Fungorum 15: 23. 2002.

Type species: *Corticium cyatheae* S. Ito & S. Imai.

Basidiomes effuse, thin, fragile, soft, pruinose to crustaceous. Hyphal system monomitic, with nodose-septate generative hyphae. Hymenium a poorly developed catahymenium with or without hyaline crystals. Dendrohyphidia numerous, simple to richly branched, faintly dextrinoid or not, often encrusted with hyaline crystals. Cystidia obclavate, elongate, tapering to an obtuse apex, walls hyaline, thin, with or without encrusting crystalline materials or small, refractive droplets. Basidia cylindrical to subclavate with or without a short stalk, often utriform with a basal or lateral swelling, 4-sterigmate; sterigmata at first stoutly digitate then elongate, aculeate, arcuate, up to 10 µm long. Basidiospores navicular, subfusiform, cylindrical or ellipsoid, walls hyaline, thin to slightly thickened, smooth, not reacting with Melzer's reagent, acyanophilous.

Habitat: fern petioles, grass stems, bamboo, rarely on hardwoods.

Remarks: *Leptocorticium* is distinguished by thin, pruinose basidiomes, utriform or stalked basidia with long sterigmata, obclavate cystidia, and dendrohyphidia. Its preferred substrates are grass and bamboo stems and fern petioles. Slight modifications and elaboration of the original generic description are proposed above. The hymenium in *Leptocorticium* is a loose, poorly developed catahymenium with the hymenial elements

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### Key to the species of *Leptocorticium*

1. Basidiospores 5–6.5 $\mu\text{m}$ wide .....	<i>L. utribasidium</i>
1. Basidiospores $\leq 5$ $\mu\text{m}$ wide .....	2
2. Basidiospores 2.5–3 $\mu\text{m}$ wide .....	<i>L. cyatheae</i>
2. Basidiospores $> 3$ $\mu\text{m}$ wide .....	3
3. Basidiospores 7–9 (9.5) $\times$ [3] 3.5–4.5 (5) $\mu\text{m}$ .....	<i>L. tenellum</i>
3. Basidiospores 9–11 (14) $\times$ [4]–5 $\mu\text{m}$ .....	<i>L. sasae</i>

arising at slightly different levels within a narrow zone. Basidia are variable within the genus as well as within an individual specimen, ranging from cylindrical with a distinct stalk to asymmetrically utriform and lacking a stalk. Dendrohyphidia may be filiform to clavate, with or without branches or knobby outgrowths that are most common at or near the apex. Similar knobby outgrowths and branches are formed on basidia and cystidia of some species. The sterigmata in *Leptocorticium* are quite striking, beginning as stoutly digitate structures that become aculeate and arcuate at maturity. The distally tapering basidiospores are distinctive but not formed in all species.

*Leptocorticium* appears to be most closely related to *Tubulicium* Oberw. and *Dextrinocystis* Gilb. & M. Blackw. with respect to basidia and sterigmata morphology and development. *Dendrothele* Höhn. & Litsch. and *Leptocorticium* develop similar basidia and dendrohyphidia; however, the thin, fragile, pruinose basidiomes and obclavate cystidia of *Leptocorticium* are distinct from those of *Dendrothele*. *Laeticorticium ussuricum* Parmasto, the type of *Dentocorticium* (Parmasto) M.J. Larsen & Gilb., develops thick, dark brown basidiomes with small conical warts, clavate basidia with short sterigmata, and dendrohyphidia. Thus, except for the presence of dendrohyphidia, *Dentocorticium* and *Leptocorticium* differ significantly in many features.

#### *Leptocorticium cyatheae* (S. Ito & S. Imai) Hjortstam & Ryvarde, Synopsis Fungorum 15: 23. 2002 **Fig. 1**

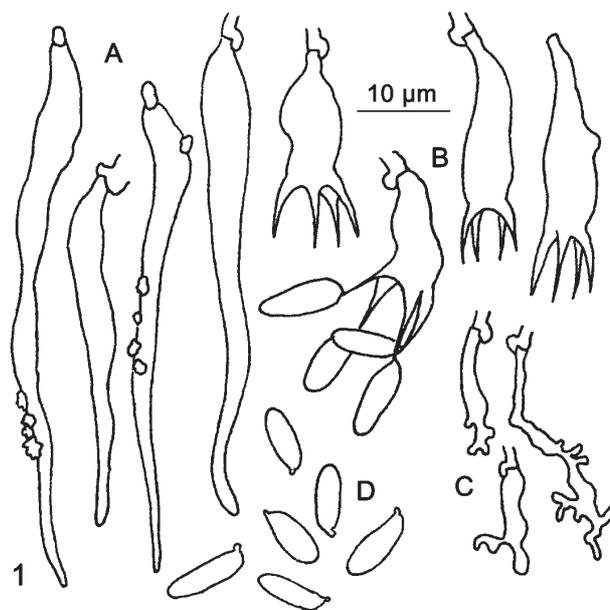
= *Corticium cyatheae* S. Ito & S. Imai, Trans. Sapporo Nat. Hist. Soc. 16: 132. 1940.

= *Dendrothele cyatheae* (S. Ito & S. Imai) N. Maek., Rep. Tottori Mycol. Inst. 31: 10. 1993.

= *Dentocorticium nephrolepidis* Boidin & Gilles, Cryptog. Mycol. 19(3): 193. 1998.

Basidiomes effuse, thin, up to 40  $\mu\text{m}$  thick, beginning as small linear colonies, confluent, up to 20  $\times$  [4] mm, smooth, pruinose to pulverulent, soft, fragile, white, grayish white, yellowish white to pinkish white; margin gradually thinning out, concolorous with hymenium, indistinct, pruinose.

Hyphal system monomitic with nodose-septate generative hyphae. Subiculum not well developed, thin, with abundant crystals, some of which dissolve in KOH and Melzer's reagent; subicular hyphae 1–3.5  $\mu\text{m}$  diam, nodose septate, often irregular, walls hyaline, thin, smooth or encrusted with



**Fig. 1:** *Leptocorticium cyatheae*, LY 14377: A, cystidia; B, basidia; C, dendrohyphidia; D, basidiospores. Scale bar = 10  $\mu\text{m}$ .

hyaline crystals. Subhymenium not well developed, indistinct. Hymenium a poorly developed cataphymenium with basidia, dendrohyphidia, and cystidia arising at slightly different levels. Dendrohyphidia filiform with simple or intricately branched at apex, 11–22  $\times$  [1.5–3]  $\mu\text{m}$ , clamped at base, walls hyaline, thin, smooth or encrusted with hyaline crystals that dissolve in KOH and Melzer's reagent. Cystidia slender obclavate, elongate, tapering toward apex, 40–70  $\times$  [3–6]  $\mu\text{m}$ , clamped at base, terminal, apex rounded, sometimes branched, walls hyaline, thin, smooth or encrusted with small, hyaline crystals especially at base. Basidia clavate, suburniform, or subcylindrical, often with a short stalk, 13–22  $\times$  [4.5–6]  $\mu\text{m}$ , tapering to 1.5–2  $\mu\text{m}$  diam at base, clamped at base, sometimes with knobby outgrowths, walls hyaline, thin, smooth, 4-sterigmate; sterigmata at first stout, then arcuate, up to 10  $\mu\text{m}$  long. Basidiospores cylindrical to subfusiform, slightly tapered at distal end, (7) 8–11.5  $\times$  [2.5–3]  $\mu\text{m}$ , walls hyaline, thin to slightly thick, smooth, not reacting with Melzer's reagent, acyanophilous.

Habitat: on petioles of dead ferns.

Distribution: Japan, Reunion Island.

**Specimens examined:** Reunion Island, Puits Arabe, on (petioles of) *Nephrolepis biserrata* (Sw.) Schott, 2 Avril 1990, leg. J. Boidin, LY14351. Holotype of *D. nephrolepidis* (LY); 6 Baril III, on (petioles of) *N. biserrata*, 4 Avril 1990, leg. J. Boidin, LY 14377 and LY14379 (LY), Baril II, 5 Dec 1996, leg. G. Gilles 65, LY16789 (LY).

The basidiospores of *L. cyatheae* are the narrowest in the genus. The lectotype of *C. cyatheae* was not available for study. Nevertheless, there is no doubt that *D. nephrolepidis* is conspecific with *L. cyatheae*. See MAEKAWA (1993) and BOIDIN & GILLES (1998) for an illustration and a description of *C. cyatheae* and *D. nephrolepidis*, respectively.

When HJORTSTAM & RYVARDEN (2002) described the new genus *Leptocorticium*, they cited eight specimens of *L. cyatheae* from Colombia and Venezuela. Of the six specimens examined, none were conspecific with *L. cyatheae*. Five specimens were identified as the new species, *L. tenellum* (see following), and Ryvar den 15706 is a species of *Hyphodontia*.

***Leptocorticium sasae*** (Boidin, Cand. & Gilles) Nakasone, comb. nov. **Figs. 2–4**

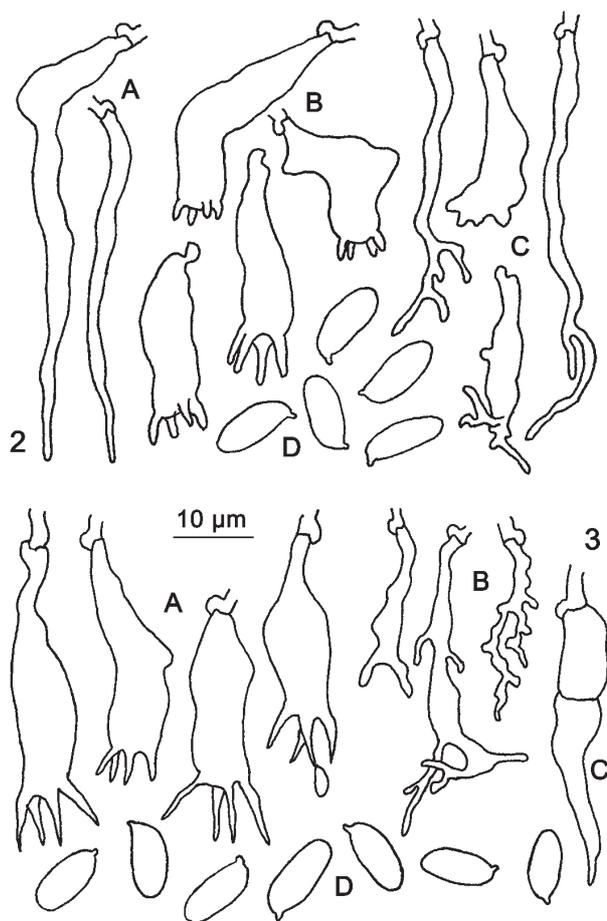
=*Dendrothele sasae* Boidin, Cand. & Gilles, Trans. Mycol. Soc. Japan 27: 466. 1986.

=*Dentocorticium sasae* (Boidin, Cand. & Gilles) Boidin, Lanq. & Duhem, Bull. Soc. Mycol. France 112: 116. 1996.

Basidiomes effuse, thin, up to 80  $\mu\text{m}$  thick, farinaceous, pruinose to subpulverulent, soft, white, yellowish white (4A2), yellowish grey (4B2), to greyish orange (5B3); margin gradually thinning out, concolorous with hymenium, indistinct. Hyphal system monomitic with nodose-septate generative hyphae. Subiculum not well developed, thin, with abundant hyaline crystals that often dissolve in KOH and Melzer's reagent; subicular hyphae 1–2.5  $\mu\text{m}$  diam, nodose-septate, moderately branched, walls hyaline, thin, smooth. Subhymenium not well developed, indistinct. Hymenium a poorly developed cataphymenium, with basidia, dendrohyphidia and cystidia developed at slightly different levels. Dendrohyphidia variously shaped, hyphoid to clavate with short knobs or simple to intricately branched outgrowths, 20–30  $\times$  1.5–4  $\mu\text{m}$ , clamped at base, walls hyaline, thin, smooth or encrusted with abundant hyaline crystals that often dissolves in KOH and Melzer's reagent. Cystidia obclavate, elongate, tapering toward obtuse apex, 35–65  $\times$  3–6  $\mu\text{m}$ , clamped at base, walls hyaline, thin, smooth. Basidia clavate, suburniform, or subcylindrical, sometimes growing laterally, often with a short stalk, (15) 20–33  $\times$  6–8  $\mu\text{m}$ , clamped at base, sometimes with knobby outgrowths, walls hyaline, thin, smooth, 4-sterigmate; sterigmata at first stoutly digitate, then aculeate and arcuate at maturity, up to 9  $\mu\text{m}$  long. Basidiospores cylindrical, ellipsoid, or subfusiform, sometimes tapering slightly toward distal end, (9) 10–11  $\times$  (3.8) 4–5  $\mu\text{m}$ , in LY14019 (10.7) 12–13 (14)  $\times$  4–4.5 (4.7)  $\mu\text{m}$ , walls hyaline, thin, smooth, not reacting with Melzer's reagent, acyanophilous.

Habitat: on fern petioles.

Distribution: France.



**Fig. 2:** *Leptocorticium sasae*, LY 10476, holotype: A, cystidia; B, basidia; C, dendrohyphidia; D, basidiospores. Scale bar = 10  $\mu\text{m}$ . – **Fig. 3:** *Leptocorticium sasae*, LY 10808: A, basidia; B, dendrohyphidia; C, cystidium; D, basidiospores. Scale bar = 10  $\mu\text{m}$ .

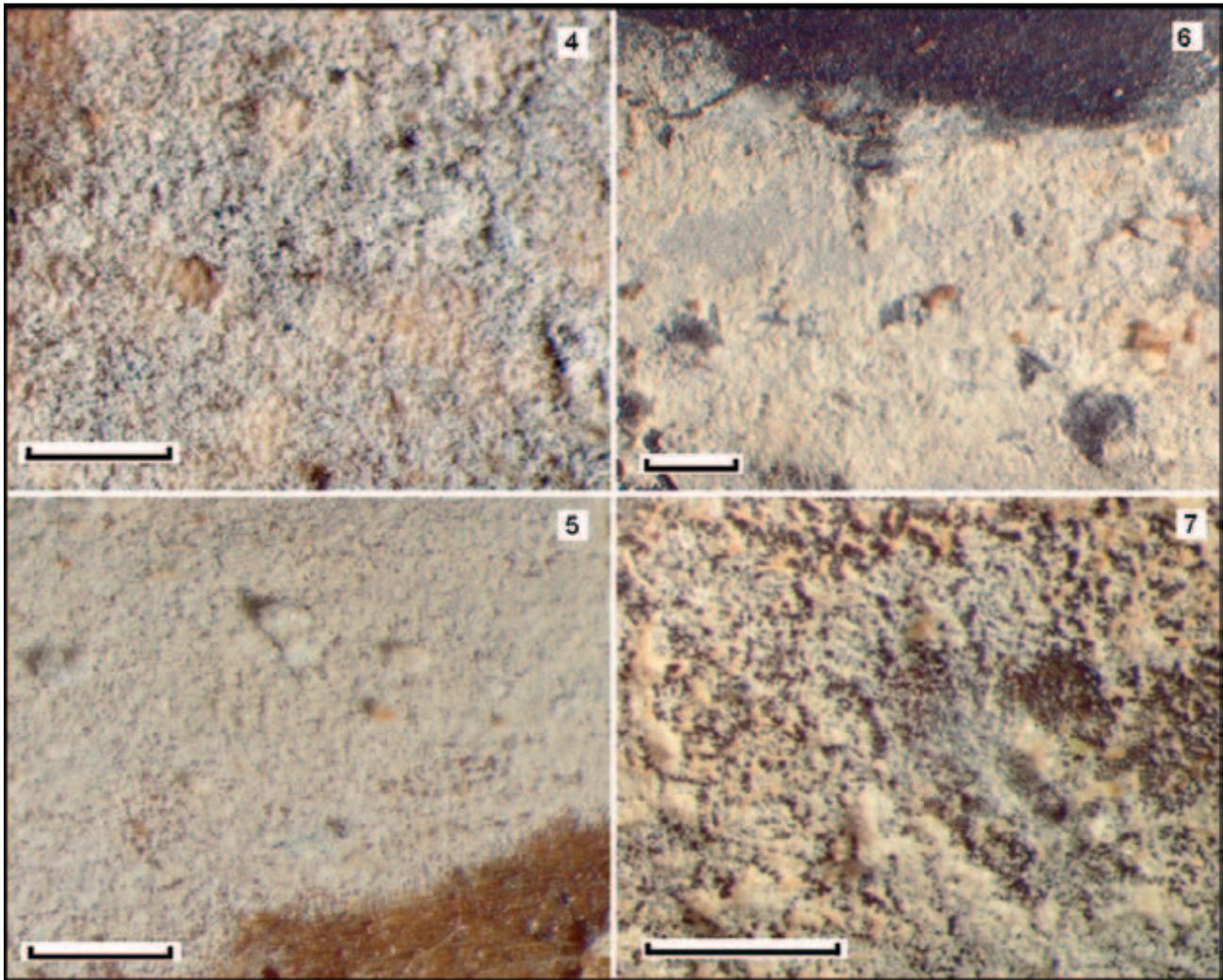
**Specimens examined:** France, Tartas, Landes, sur gaines de *Pseudosasa japonica* Makino, 18 Sept 1984, leg. G. Gilles 239, LY10476. Holotype (LY) and 23 Nov 1984, leg. G. Gilles 360, LY10808 (LY); Souprosse (40), on *Pteridium* sp., 26 Jan 1990, leg. G. Gilles 912, LY14019 (LY).

*Leptocorticium sasae* is most similar to *L. tenellum* but has basidiospores that are slightly longer and wider. This is a morphologically variable species with respect to basidiospores and dendrohyphidia. Knobs and branches sometimes develop on cystidia and basidia. See BOIDIN, CANDOUSSAU & GILLES (1986) and BOIDIN & GILLES (1998) for descriptions and illustrations of *L. sasae*.

***Leptocorticium tenellum*** Nakasone, sp. nov. **Figs. 5–9**

Differt a *Leptocorticium sasae* basidiosporis minoribus et basidiis saepe basaliter distincte inflatis. Holotypus: Colombia, Dep. Cundinamarca, km 16 en la via Mosquera-La Mesa, 2700 m.a.s.l., 3 June 1978, L. Ryvar den 15714 (O).

Etymology: *tenellus* (Latin, adj.), tender, delicate.



**Fig. 4–7:** 4. *Leptocorticium sasae*, LY 10476: close-up of hymenophore. Scale bar = 0.5 mm. – 5. *Leptocorticium tenellum*, LR 15584: close-up of hymenophore and margin. Scale bar = 0.5 mm. – 6. *Leptocorticium tenellum*, LR 15714, holotype: general aspect of basidiome. Scale bar = 1 mm. – 7. *Leptocorticium tenellum*, LR 15714, holotype: close-up of hymenophore near margin. Scale bar = 0.5 mm.

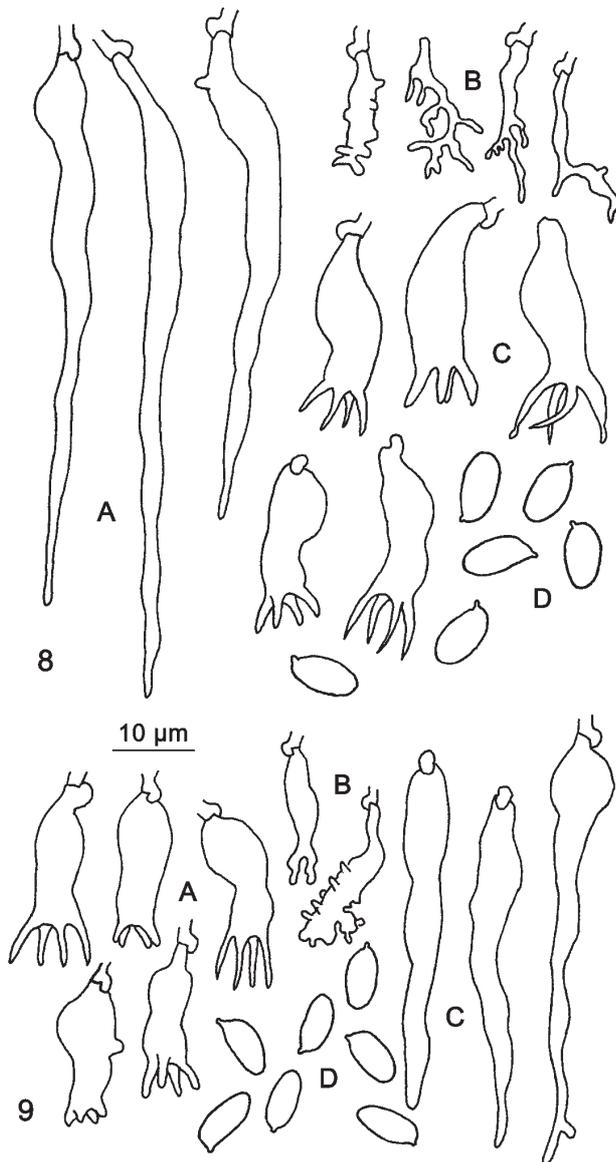
Basidiomes effuse, beginning as small linear colonies, up to 8 × 2 cm, confluent, thin, up to 50 µm thick, smooth, pruinose to submembranous, fragile, white, yellowish white to yellowish grey [4 (A–B) 2], pale yellow (4A3), or orange grey (5B2); margin abrupt or thinning out, fibrillose or pruinose to farinaceous.

Hyphal system monomitic with nodose-septate generative hyphae. Subiculum thin, poorly developed with abundant hyaline crystals that partially dissolve in KOH and Melzer's reagent; subicular hyphae 1.5–3.5 µm diam, moderately branched, walls hyaline, thin, smooth or encrusted. Subhymenium not observed. Hymenium a thin cataphymenium with dendrohyphidia, cystidia, and basidia developed at slightly different levels. Dendrohyphidia abundant, variously shaped, filamentous to clavate with knobs or branches at apex or scattered throughout length, 12–35 × 4 µm, with a basal clamp connection, terminal, walls hyaline, thin, smooth or encrusted with

small hyaline crystals. Cystidia obclavate, slender, elongate, gradually tapering to a rounded apex, with a short stalk, 45–75 (90) × 3–8 µm, with a basal clamp connection, sometimes with outgrowths or knobs, walls hyaline, thin, smooth or encrusted with crystalline encrustations. Basidia utriform or clavate to cylindrical, sometimes with a median constriction, sometimes with a short stalk, 15–26 × 4.5–8 µm, with a basal clamp connection, occasionally with knobby outgrowths, walls hyaline, thin, smooth, 4-sterigmate; sterigmata at first stoutly digitate then elongating at maturity, becoming aculeate and arcuate, up to 9 µm long. Basidiospores cylindrical to ellipsoid or subfusiform, slightly tapering toward apiculus, sometimes tapering at distal end, 7–9 (9.5) × 3 (3) 3.5–4.5 (5) µm, walls hyaline, thin, smooth, not reacting in Melzer's reagent, acyanophilous.

Habitat: on petioles of tree ferns, *Cyathea*, and hardwoods.

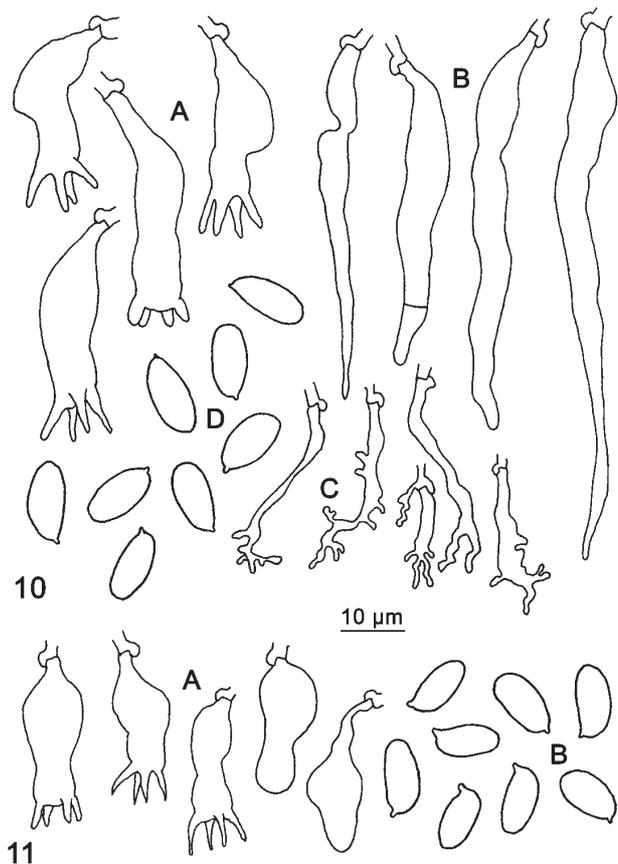
Distribution: Venezuela, Colombia.



**Fig. 8:** *Leptocorticium tenellum*, LR 15714, holotype: A, cystidia; B, dendrohyphidia; C, basidia; D, basidiospores. Scale bar = 10 µm. – **Fig. 9:** *Leptocorticium tenellum*, LR 15584: A, basidia; B, dendrohyphidia; C, cystidia; D, basidiospores. Scale bar = 10 µm.

**Specimens examined:** Colombia, Dep. Cundinamarca, km 20 en la via Mosquera-La Mesa, 2300 m.a.s.l., 6 June 1978, on fern, leg. L. Ryvar den 15570, 15584 (O); on *Cyathea* sp., 3 June 1978, leg. L. Ryvar den 15437, 15714, + 15717 (O). – Venezuela, Estado Bolivar, Sifontes Tumerermo, Carretera Tumerermo-Bochinche Camp, Maderero de Lut., on hardwood, 17 Nov 1994, L. Ryvar den 35217 (O).

*Leptocorticium tenellum* is most similar to *L. sasae*, which has slightly longer and wider basidiospores on average. Basidia in *L. tenellum* can take various forms but are frequently utri-form; the sterigmata are typical for the genus. The cited specimens were first identified as *L. cyatheae* (HJORTSTAM & RYVARDEN 2002); however, basidiospores of *L. cyatheae* are significantly narrower and longer than those of *L. tenellum*.



**Fig. 10:** *Leptocorticium utribasidium*, LY 16851, holotype: A, basidia; B, cystidia; C, dendrohyphidia; D, basidiospores. Scale bar = 10 µm. – **Fig. 11:** *Leptocorticium utribasidium*, LY 15364: A, basidia; B, basidiospores. Scale bar = 10 µm.

Specimen Ryvar den 15706, also cited in HJORTSTAM & RYVARDEN (2002), is sterile but appears to be a *Hyphodontia* species.

***Leptocorticium utribasidium*** (Boidin & Gilles) Nakasone, comb. nov.

**Figs. 10–11**

≡ *Dentocorticium utribasidium* Boidin & Gilles, Cryptog. Mycol. 19(3): 196. 1998.

Basidiomes effuse, thin, up to 100 µm thick, coalescing, largest 20 × 3 mm, smooth, pruinose to pulverulent, soft, fragile, white to yellowish white [(3–4) A2], mostly continuous; margin abrupt, quickly thinning out, concolorous with hymenium.

Hyphal system monomitic with nodose-septate generative hyphae. Subiculum not well developed, a thin, agglutinated tissue lacking crystals; subicular hyphae 1–3 µm diam, nodose-septate, frequently branched, walls hyaline, thin, smooth. Subhymenium indistinct. Hymenium a poorly developed catyhymenium with dendrohyphidia, cystidia and basidia formed at slightly different levels. Dendrohyphidia filamentous to clavate with simple or intricate branching at apex, also with side branches, 15–33 × 1.5–4 µm, clamped at base, walls hyaline, thin, smooth. Cystidia scattered, obclavate to subfusiform, ta-

pering toward apex,  $50\text{--}85 \times 7.5\text{--}8 \mu\text{m}$ , clamped at base, terminal, apex rounded, sometimes with adventitious septa, walls hyaline, thin, smooth. Basidia cylindrical to utriform, sometimes growing out laterally, often stalked, (18)  $23\text{--}40 \times 7\text{--}9 \mu\text{m}$ , tapering to  $1.5\text{--}2 \mu\text{m}$  diam at base, clamped at base, walls hyaline, thin, smooth, 4-sterigmate; sterigmata at first stout, digitate then arcuate, up to  $10 \mu\text{m}$  long. Basidiospores cylindrical to ellipsoid, (10)  $11\text{--}13 \times 3\text{--}6 (6.5) \mu\text{m}$ , sometimes in clusters, walls hyaline, thin to slightly thick, smooth, not reacting in Melzer's reagent, acyanophilous.

**Specimens examined:** Reunion Island, Palmistes V, (sur une branche écorcée, au sol), 2 Mai 1997, leg. G. Gilles 026, LY16851. Holotype (LY). – France, étang de Florent-sur-Argonne (Meuse), forêt Communale de Valmy, sur *Phragmites* sp., 9 Oct. 1992, leg. B. Duhem 2801, LY15364 (LY).

*Leptocorticium utribasidium* is characterized by large basidiospores that are the largest in the genus and by the absence of hymenial crystals. This taxon shows some similarities to *Dendrothele* and *Dendrocorticium*, but because of the elongated, obclavate leptocystidia, it is placed in *Leptocorticium*. See BOIDIN & GILLES (1998) for another description and illustration of this taxon.

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